

Figure 1

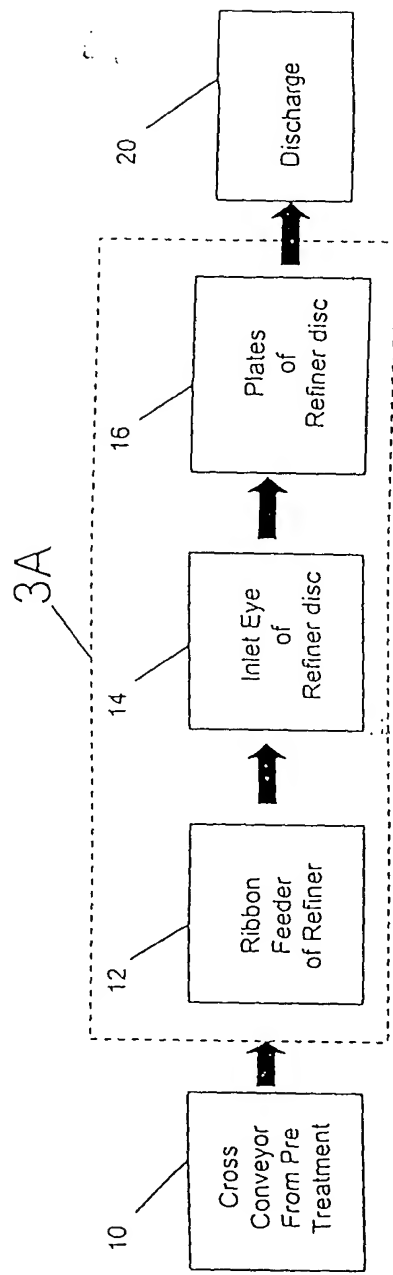


Figure 1A

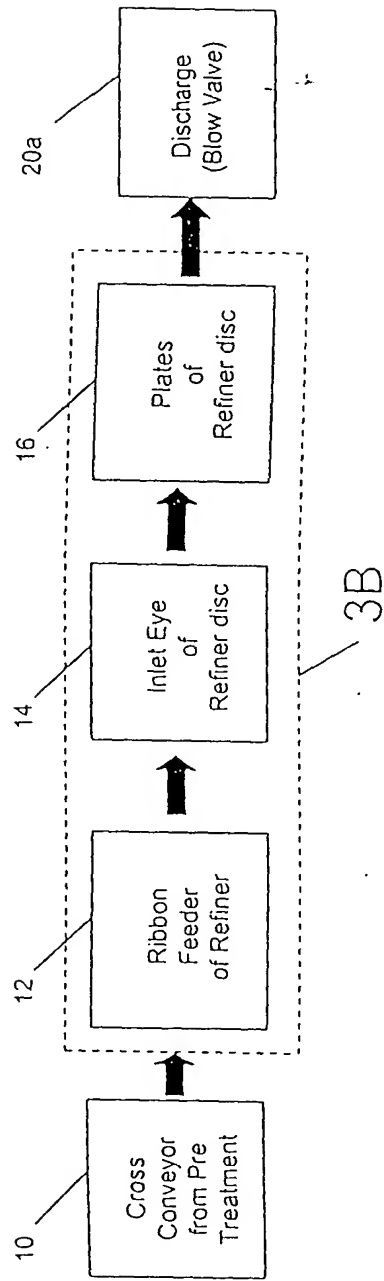


Figure 1B

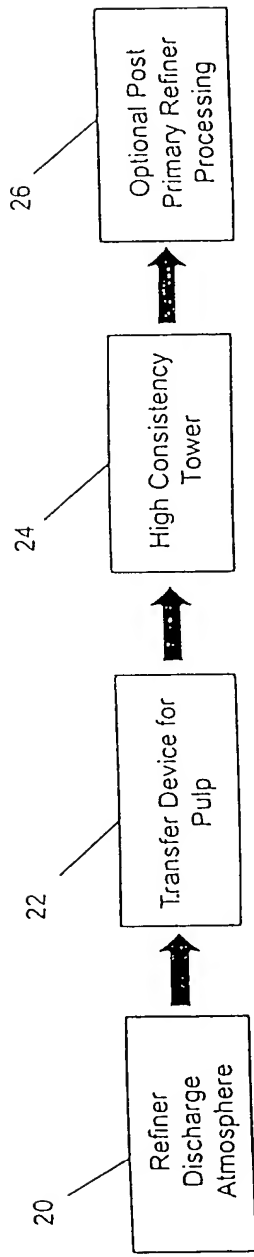


Figure 1C

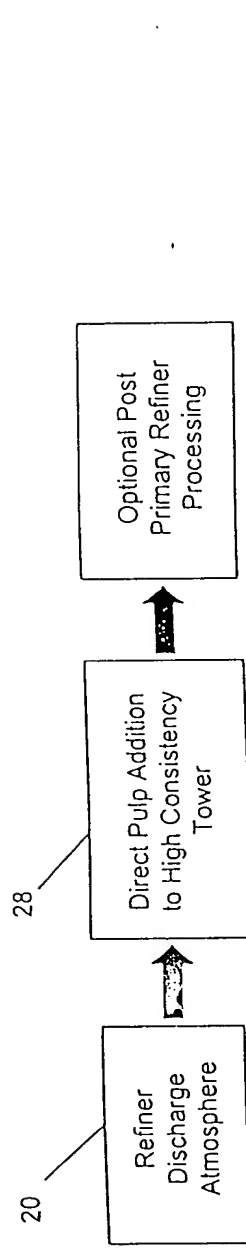


Figure 1D

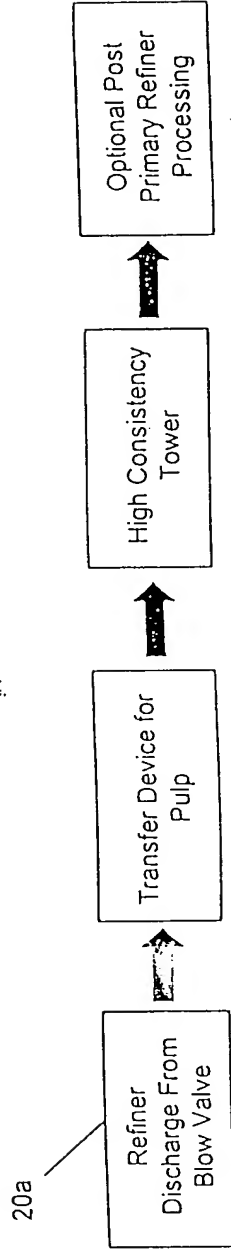


Figure 1E

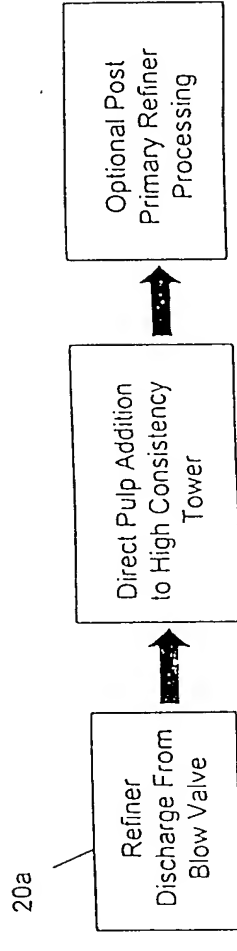


Figure 1F

Figure 2

SAMPLE	A2	A3	A4	A10	A11	A12	A14	A15	A16
Chem. Applied:	Chip + Refiner			Chip			Refiner		
% T.A	3.4			3.3			4.2		
% H ₂ O ₂	2.6			2.4			3.3		
Residual:	0.29			0.25			0.48		
% H ₂ O ₂	8.2			8.6			8.2		
pH									
Total SEC (kwh/odmt)(a)	947	1223	1543	874	1181	1531	1127	1389	1729
CSF (mL)	481	338	223	436	340	225	537	436	266
TENSILE INDEX (N.m/g)	16.4	21.9	29.3	18.4	25.1	31.1	11.4	17.1	24.9
BULK (cm ³ /g)	3.13	2.81	2.47	3.16	2.78	2.51	3.58	3.13	2.63
BURST INDEX (kPa.m ² /g)	0.56	0.77	1.16	0.68	1.04	1.27	0.43	0.64	1.03
TEAR INDEX (mN.m ² /g)	2.7	3.0	4.1	3.5	3.6	4.4	2.3	2.7	3.3
T.E.A.(J/m ²)	5.7	9.0	15.5	7.2	11.9	16.7	3.2	6.5	11.3
ISO BRIGHTNESS	76.8	78.0	78.3	74.6	75.2	74.6	76.7	77.5	78.1
% OPACITY	84.4	85.2	86.8	85.0	85.6	85.3	83.7	86.1	86.3
SCATT. COEFF. (m ² /kg)	50.7	53.4	57.7	49.2	52.3	52.7	48.4	53.3	57.1

Note: a) A commercial APMP system normally uses about 70% or less SEC than the lab.

Figure 3

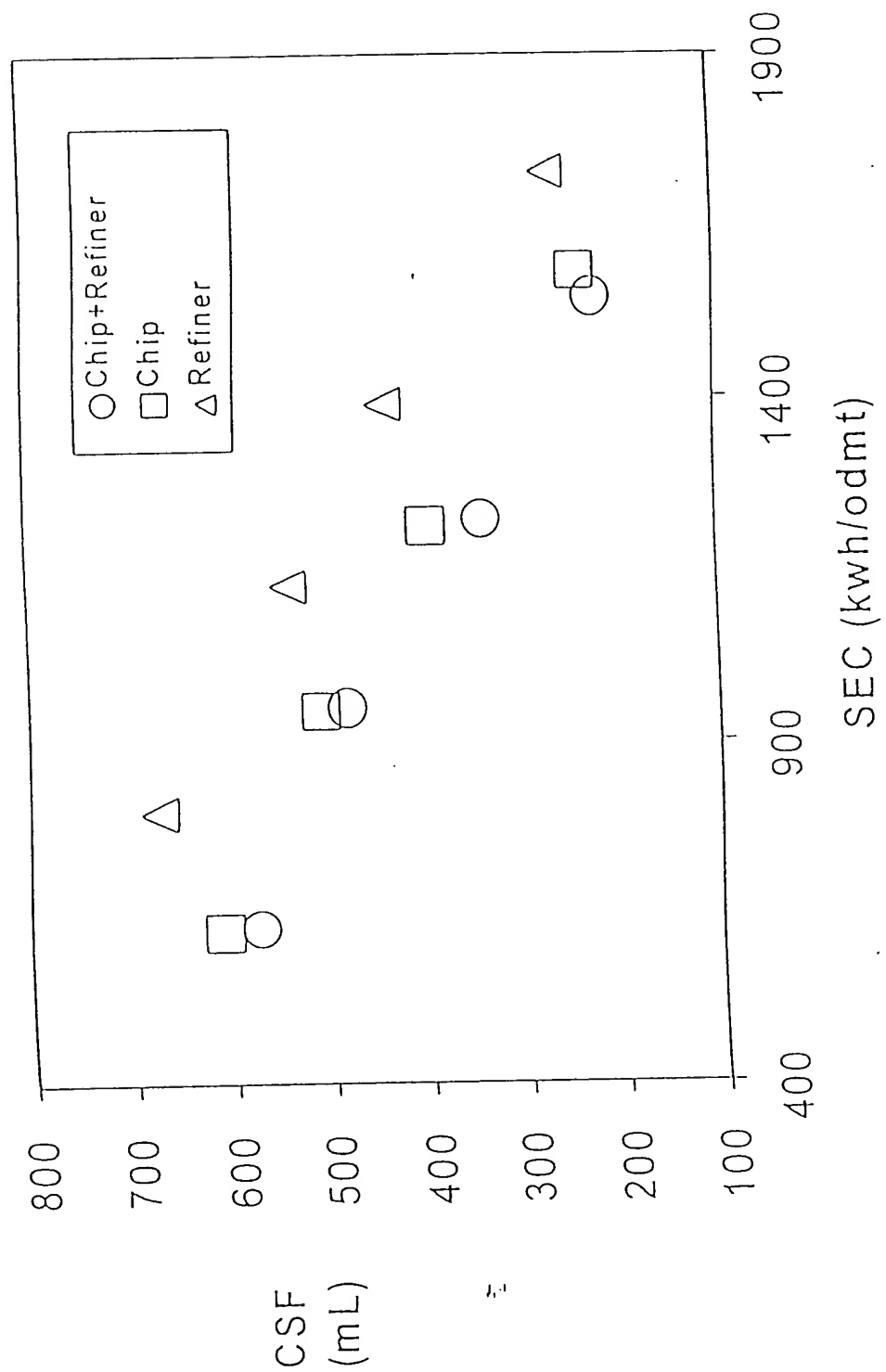


Figure 4

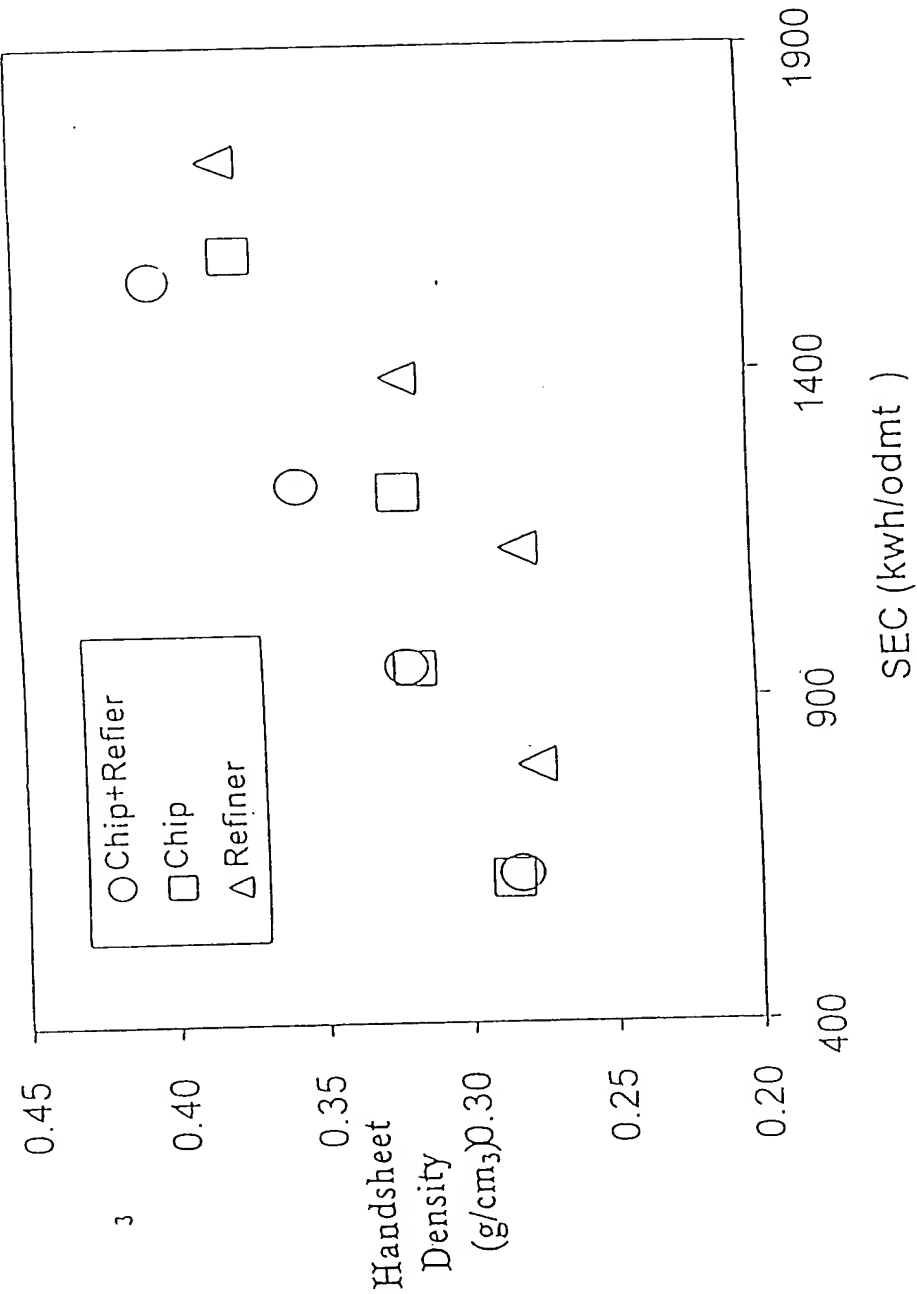


Figure 5

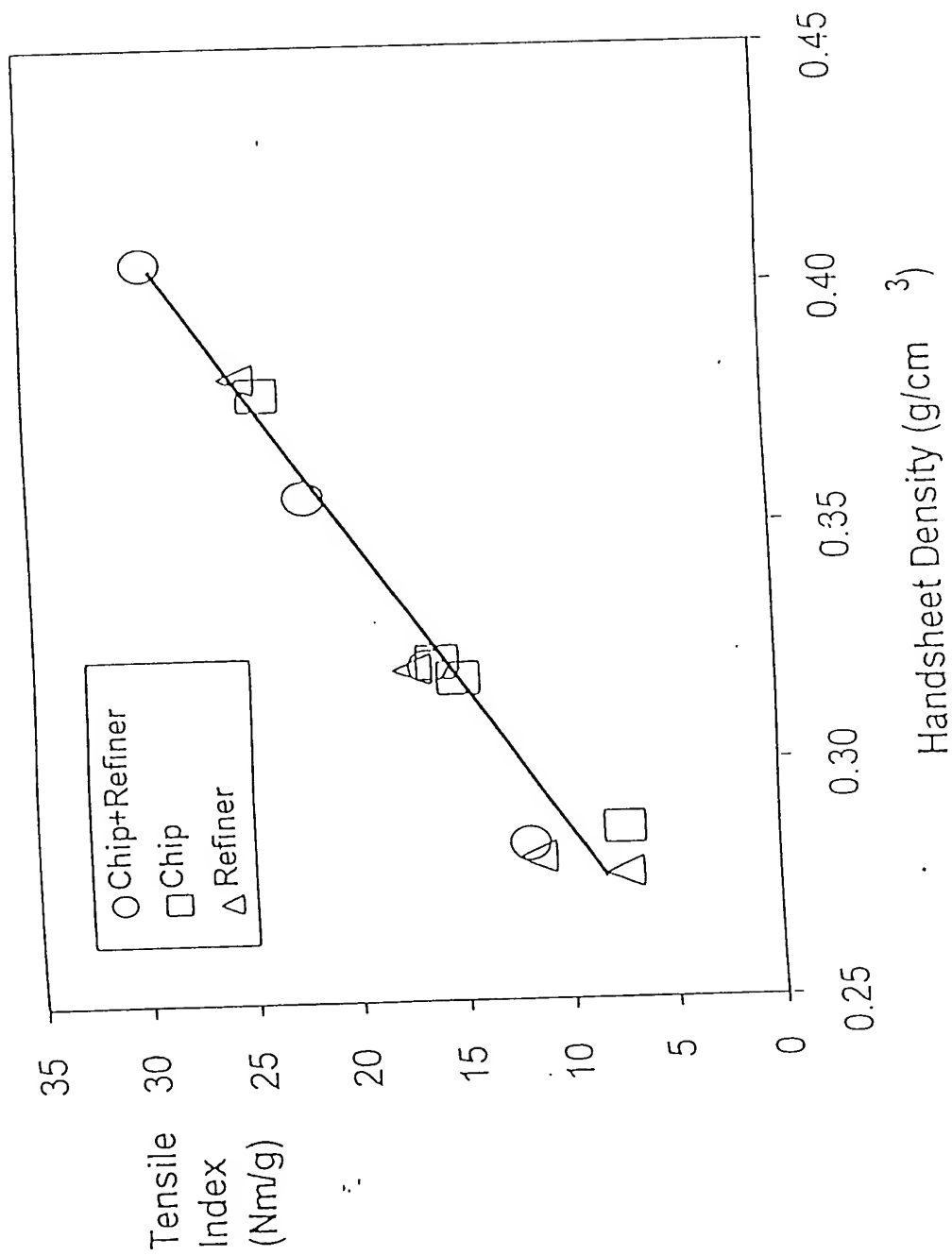


Figure 6

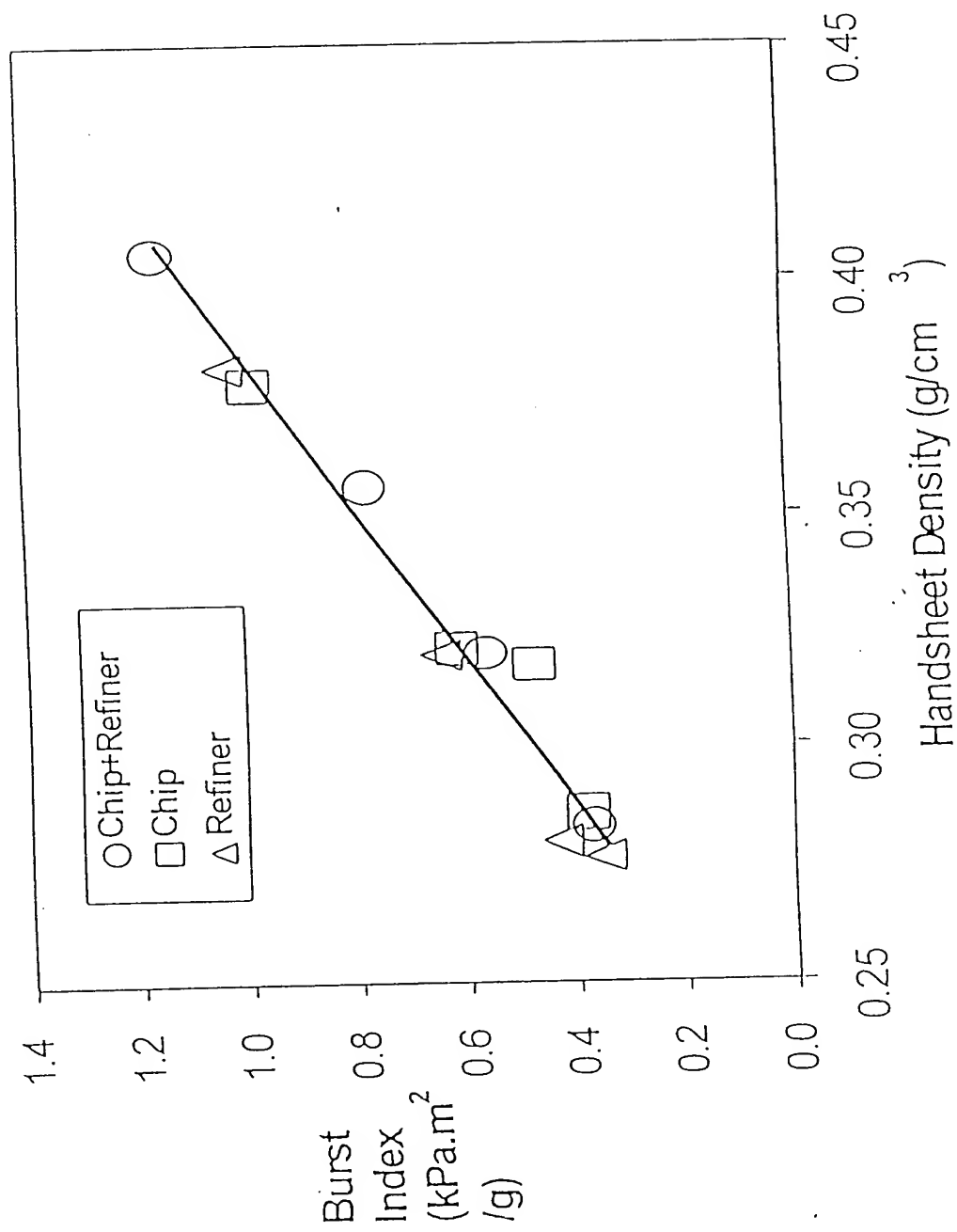


Figure 7

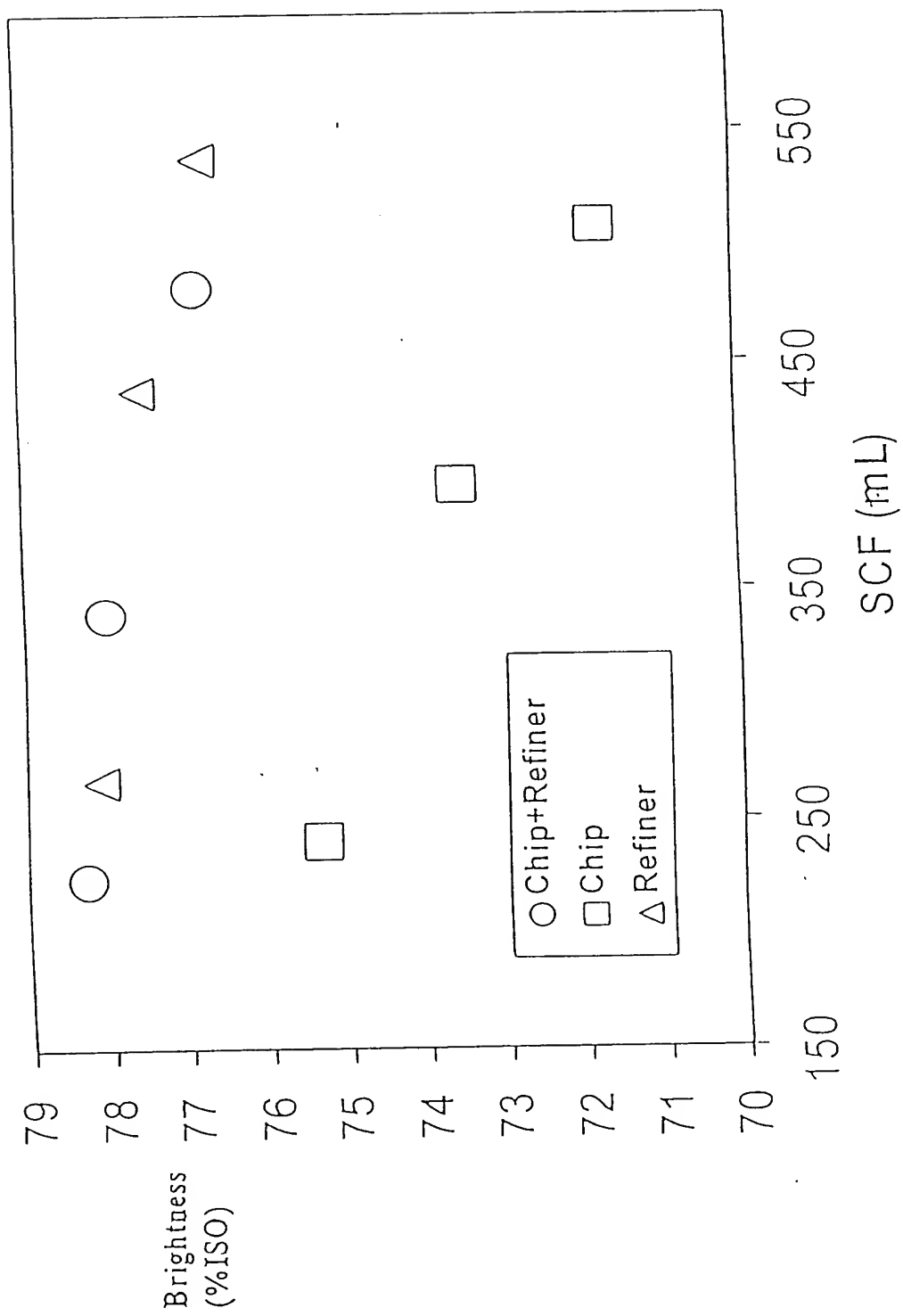


Figure 8

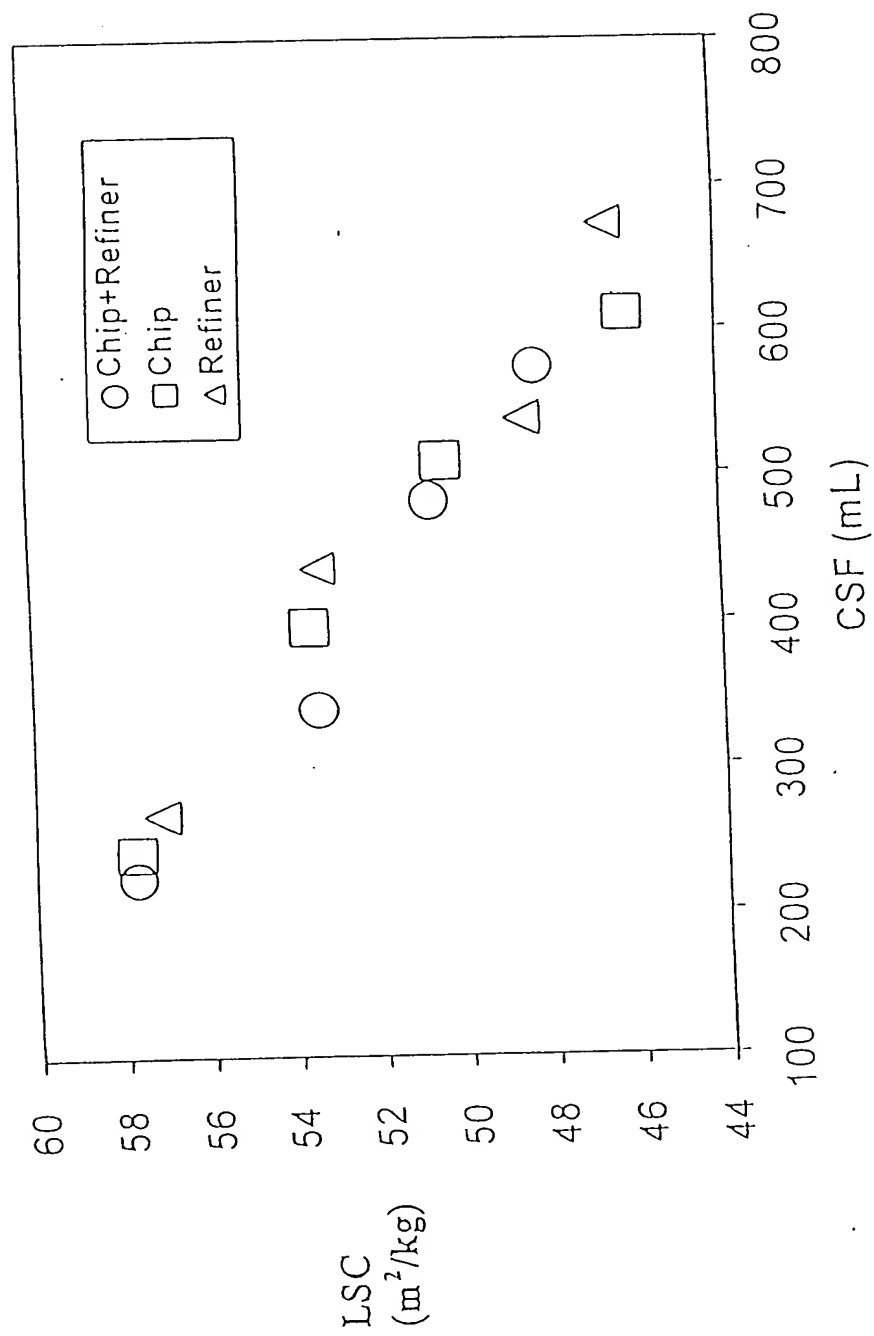


Figure 9

Aspen	Atmospheric	Pressurized
<i>First Stage Impregnation</i>		
% DTPA	0.2	0.2
<i>Second Stage Impregnation</i>		
% TA	3.7	3.9
% H ₂ O ₂	3.3	3.0
% Silicate	3.4	3.3
% MgSO ₄	0.1	0.1
<i>Primary Refiner</i>		
Casing Pressure (kPa)	0.0	140
% TA	1.8	2.0
% H ₂ O ₂	2.5	2.4
% Silicate	2.4	2.6
% MgSO ₄	0.10	0.1
<i>Final Pulp</i>		
Brightness (% ISO)	84.2	84.7
pH Residual	8.8	9.0
% TA Residual	0.3	0.5
% H ₂ O ₂ Residual	2.1	1.5
Total TA Consumed (%)	5.2	5.4
Total H ₂ O ₂ Consumed (%)	3.7	3.9

Figure 10

Birch	Atmospheric	Pressurized
<i>First Stage Impregnation</i>		
% DTPA	0.2	0.2
<i>Second Stage Impregnation</i>		
% TA	2.0	2.0
% H ₂ O ₂	2.3	2.3
% Silicate	2.4	2.4
% MgSO ₄	0.1	0.1
<i>Primary Refiner</i>		
Casing Pressure (kPa)	0	140
% TA	1.3	1.3
% H ₂ O ₂	1.8	1.7
% Silicate	1.8	1.7
% MgSO ₄	0.1	0.1
<i>Final Pulp</i>		
Brightness (% ISO)	82.4	82.6
pH Residual	8.0	8.0
% TA Residual	0.2	0.1
% H ₂ O ₂ Residual	0.5	0.6
Total TA Consumed (%)	3.1	3.2
Total H ₂ O ₂ Consumed (%)	3.6	3.4

Figure 11

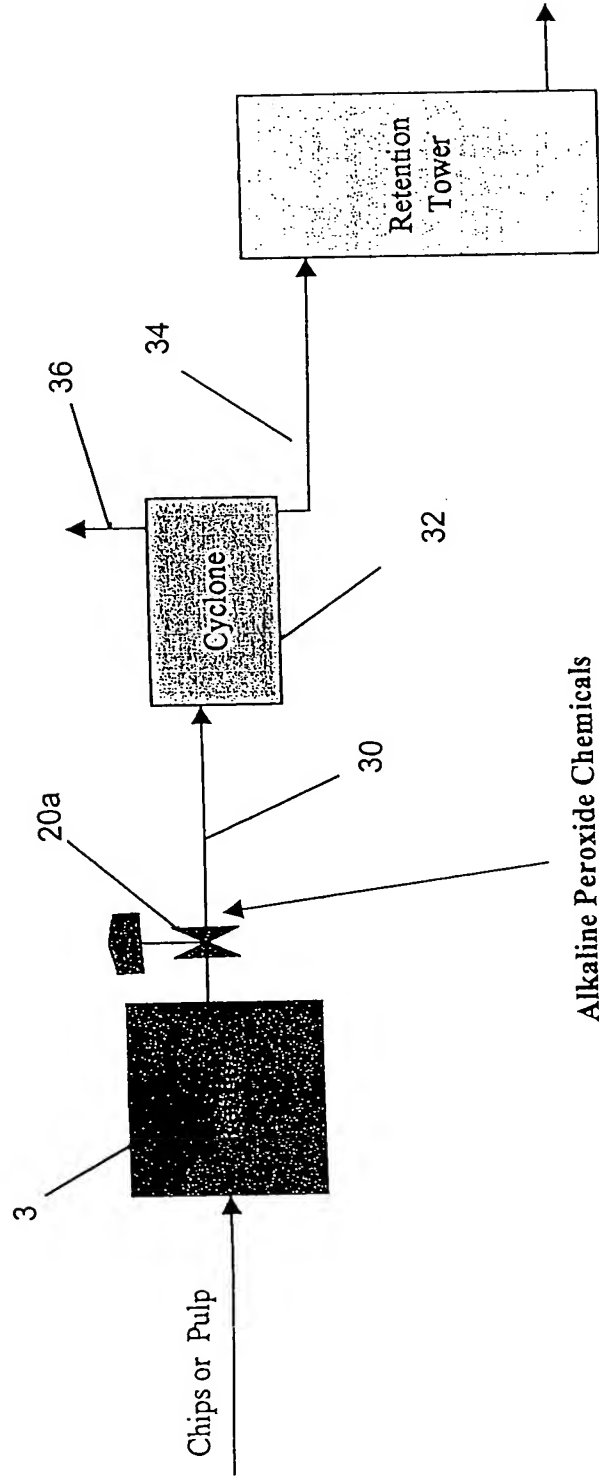


Figure 12

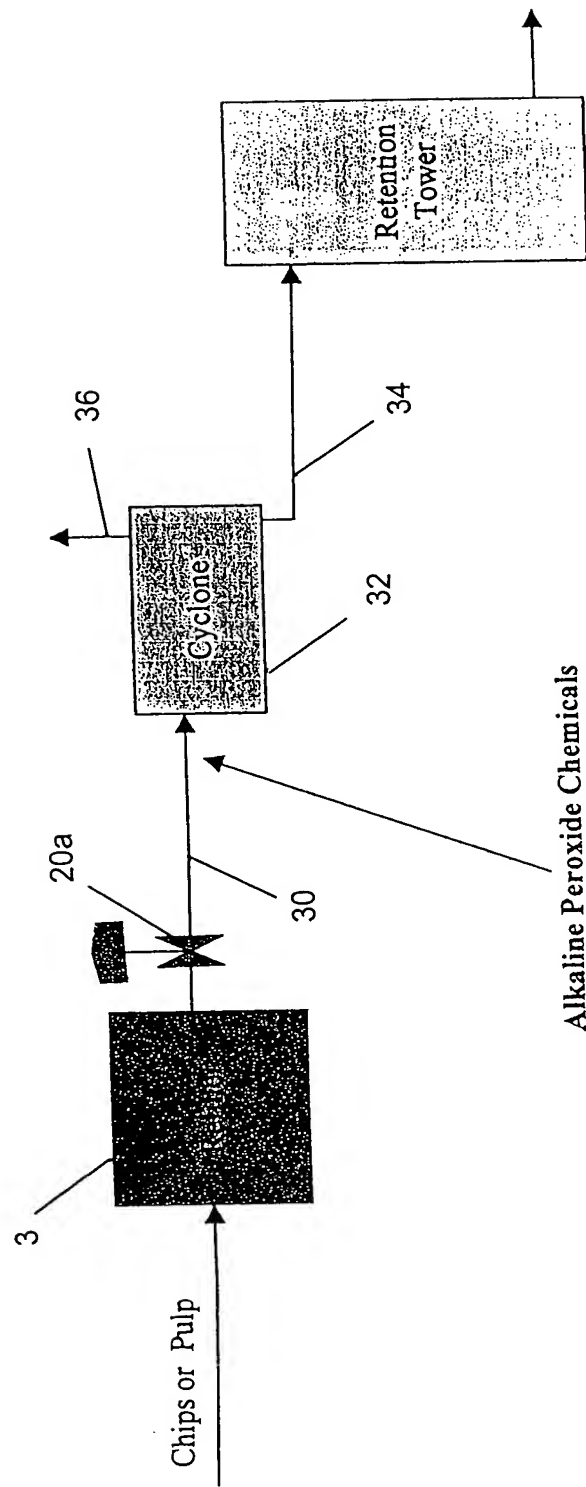


Figure 13

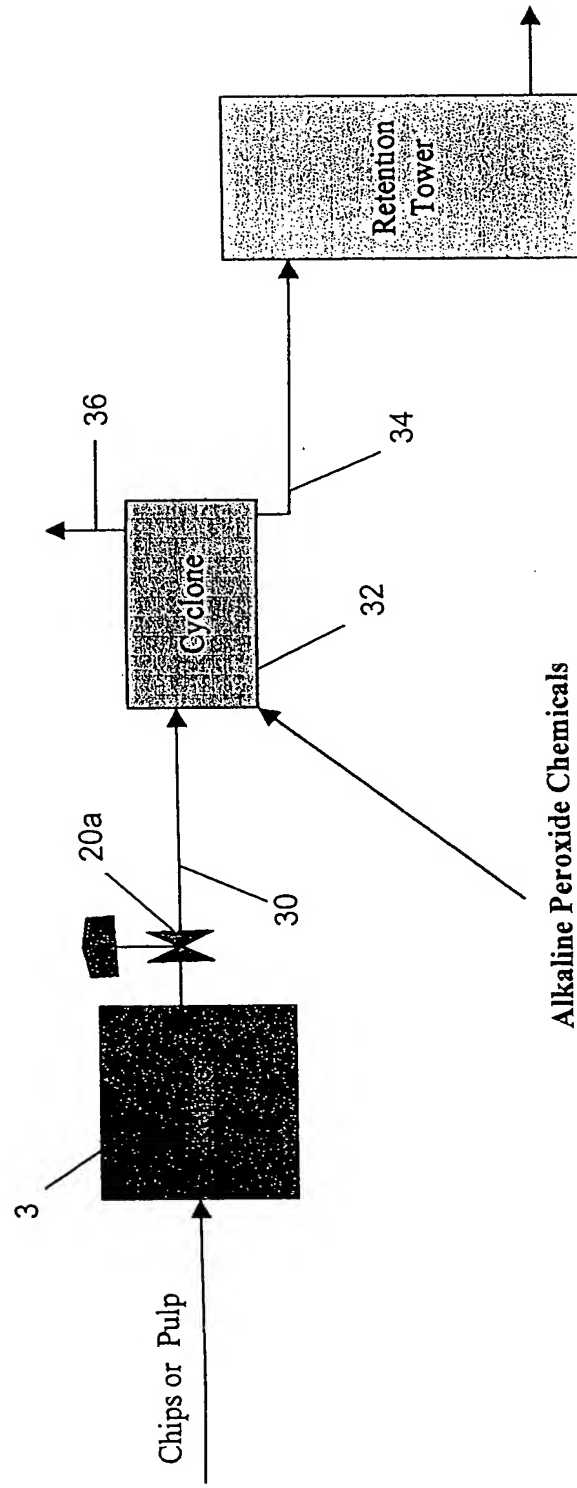


Figure 14

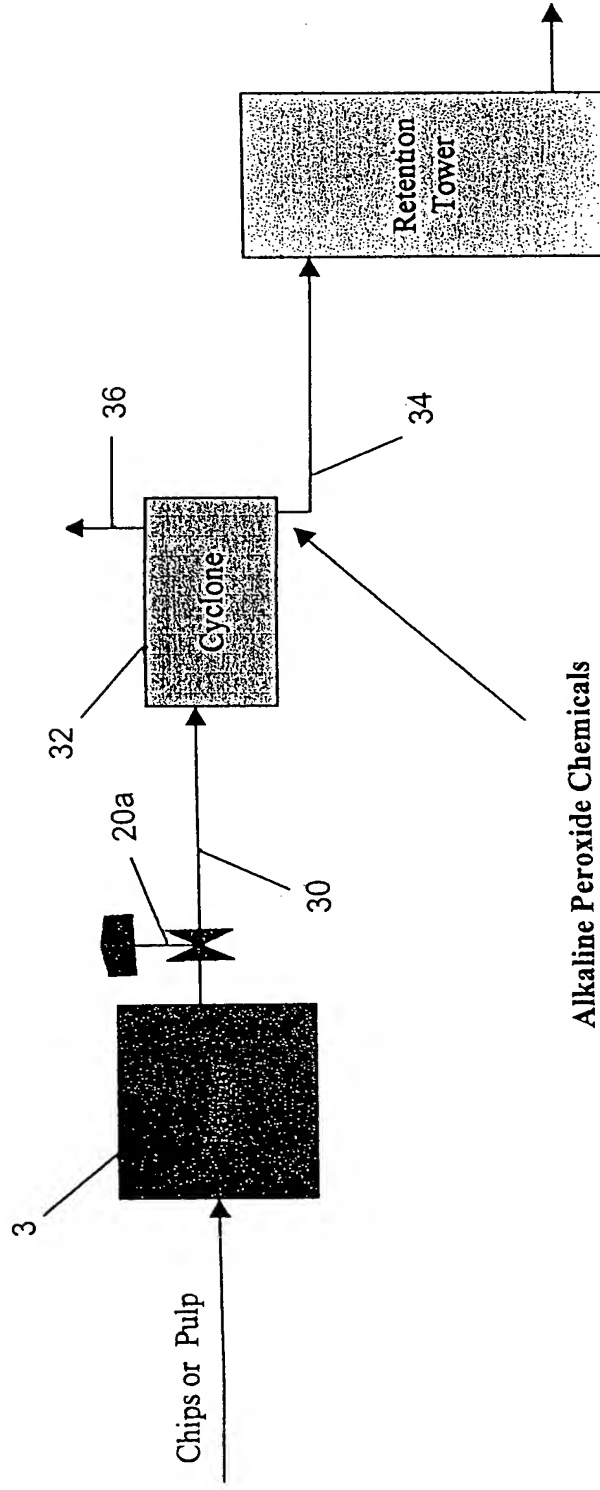


FIGURE 15

Results from Birch and Maple		Birch		Maple	
Wood		Refiner Eye A1	Blow Line A2	Refiner Eye A3	Blow Line A4
Dosing Point Sample No.					
<i>Conditions at Primary Refiner</i>					
Pressure at Inlet (Bar)		0	0	0	0
Pressure in Casing (Bar)		1.4	1.4	1.4	1.4
% DTPA		0.16	0.16	0.13	0.13
% MgSO ₄		0.16	0.16	0.13	0.13
% Silicate		2.3	2.3	2.5	2.5
% TA (Residual)		1.8 (0.3)	1.8 (0.5)	1.2 (0.1)	1.2 (0.1)
% H ₂ O ₂ (Residual)		2.4 (1.0)	2.4 (1.1)	2.1 (1.8)	2.1 (2.1)
Final pH		8.9	9.0	7.4	7.6
<i>Final Pulp Properties</i>					
Brightness (% ISO)		84.8	84.2	79.2	81.9
Light Absorption Coefficient (m ² /kg)		0.27	0.25	0.5	0.32
Freeness (ml)		285	315	320	295

FIGURE 16

Table 2. Results From Different Softwoods

Wood	Spruce		Red Pine	
	R.E. A5	B.L. A6	R.E. A7	B.L. A8
Dosing Point Sample No.				
<i>Conditions at Primary Refiner</i>				
Pressure at Inlet (Bar)	0	0	0	1.73
Pressure in Casing (Bar)	0	1.73	0	1.73
% DTPA	0.22	0.22	0.2	0.18
% MgSO ₄	0.11	0.11	0.06	0.06
% Silicate	1.1	1.1	2.0	1.8
% TA ^a (Residual)	0.8 (0.1)	0.9 (0.2)	1.2 (0.5)	1.2 (0.1)
% H ₂ O ₂ (Residual)	1.2 (1.3)	1.2 (1.7)	1.9 (1.1)	1.8 (1.1)
Final pH	8.7	9.1	8.1	8.1
<i>Final Pulp Properties</i>				
Brightness (% ISO)	78.2	78.8	71.2	71.8
Light Absorption Coefficient (m ² /kg)	0.60	0.56	1.01	0.84
Freeness (ml, CSF)	49	47	82	99

FIGURE 17

Table 3. Results From Softwood Blend Under Elevated Pressure At Primary Refiner.

Dosing Point Sample No.	Refiner Eye A9 ^a	Blow Line A10 ^a
<i>Conditions at Primary Refiner</i>		
Pressure at Inlet (Bar)	2.1	4.3
Pressure in Casing (Bar)	2.1	4.3
% TA	1.7	1.7
% H ₂ O ₂ (Residual)	2.8 (1.1)	2.8 (1.1)
Final pH	7.6	7.5
<i>Final Pulp Properties</i>		
Brightness (% ISO)	73.7	73.4
Light Absorption Coefficient (m ² /kg)	1.1	0.96
Freeness (ml)	47	57

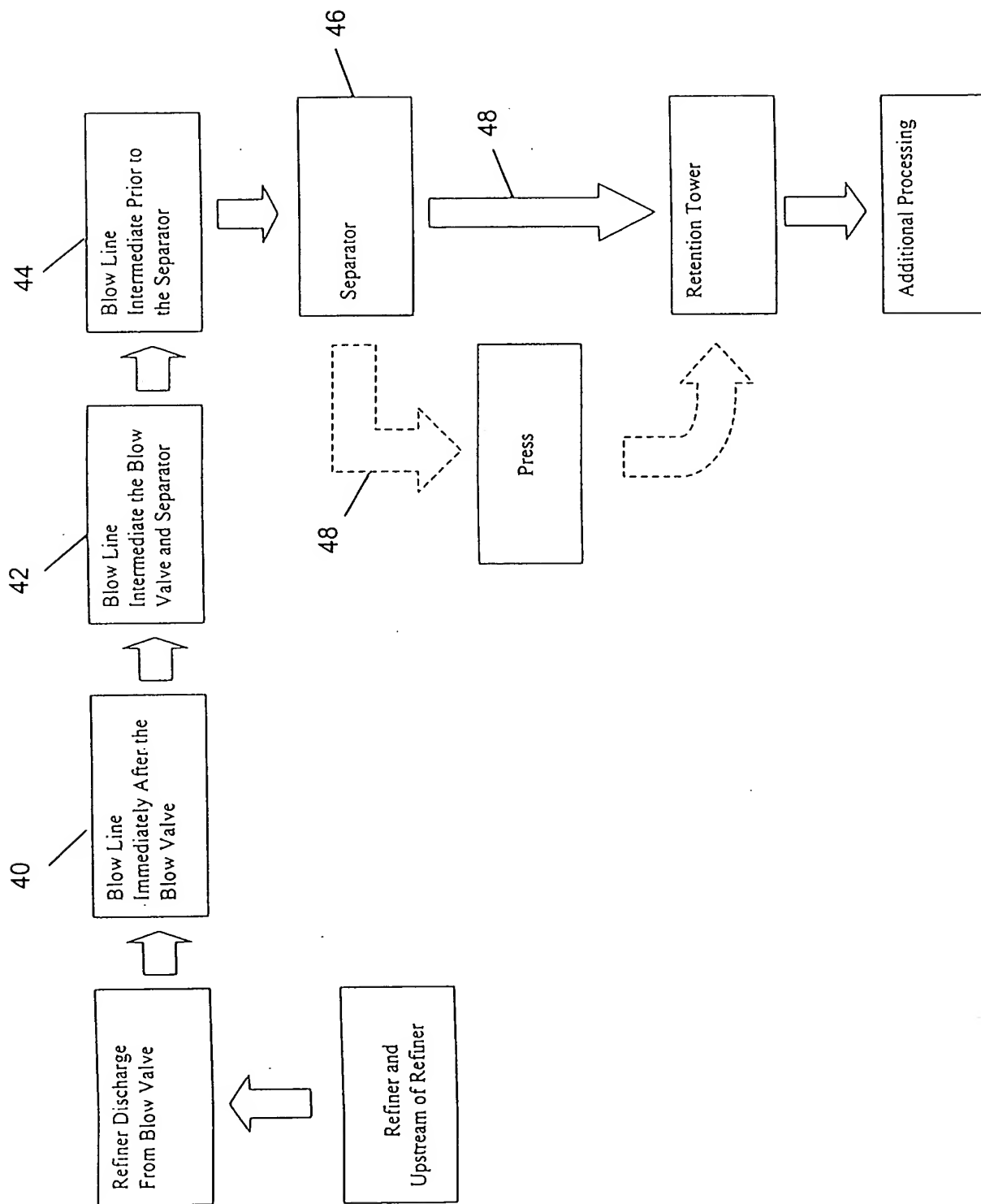


FIGURE 18